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Recent Understanding of Calorimetric Glass Transition

A Plenary Talk

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Recent Understanding of Calorimetric Glass Transition

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Glass transition is one of the most fascinating complicated problems in condensed matter science. Despite considerable progress in understanding it,[1-4] some key questions have not been fully answered. For instance, what is the microscopic origin of glass transition? How is glass transition associated with dynamical and static heterogeneities? How does glass transition depend on chemical bonding type, medium-range order structure, and topological arrangement? Why do some glass formers exhibit polyamorphic transition?[5] In my talk, I will give an overview about our recent understanding of glass transition, with emphasis on calorimetric glass transition, by describing the following aspects:

1) Correlations between sub-T_g relaxation and the Boson peak for hyperquenched oxide and metallic glasses;[6-8]
2) Energetic/structural heterogeneities in supercooled liquids;[1,9,10]
3) Structural response to sub-T_g aging in the extremely poor glass formers;[11]
4) Calorimetric glass transition in mechanically amorphized materials;[12]
5) Glass formation and polyamorphic transitions in metal-organic frameworks (MOFs);[13]

Finally, I point out some potentially important directions in further understanding the calorimetric glass transition.

References:

1. Y.Z. Yue and C.A. Angell, *Nature* 427 (2004) 717-720.
2. G.N. Greaves, et al., *Science* 308 (2005) 1299–1302.
3. Y.Z. Yue, *J. Non-Cryst. Solids* 354 (2008) 1112-1118.
4. Y.Z. Yue, *Front. Mater*. 2 (2015) 54.
5. G.N. Greaves, et al., *Science* 322 (2008) 566–570.
6. C.A. Angell, et al, *J. Phys.: Condensed Mat.* 15 (2003) S1051-S1068.
7. A. Monaco, et al., *Phys. Rev. Lett.* 96 (2006) 205502.
8. A. Chumakov, et al., *Phys. Rev. Lett.* 112 (2014) 025502.
9. Y.Z. Yue, et al., *Appl. Phys. Lett*. 81 (2002) 2983-2985
10. Y.F. Zhang, et al., *J. Am. Ceram. Soc*. 96 (2013) 3035-3037.
11. Y.F. Zhang, et al., *J. Alloys Comp*. 741 (2018) 331-336
12. A. Qiao, et al., *J. Am. Ceram. Soc.* 100 (2017) 968-974
13. T.D. Bennett, et al., *Nature Commun.* 6 (2015) 8079.